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ABSTRACT

Designed for use in the selection of apprentices, trainees, technical and trade personnel, and any other persons who need to read and understand text of a technical nature, this Applied Reading Test specimen set contains six passages and 32 items, has a 30-minute time limit, and is presented in a reusable multiple choice test booklet. The specimen set includes reference group data in the form of percentile ranks and stanines, with associated descriptive ratings; t-scores and z-scores are also provided. Two parallel forms of the test are provided in the specimen set as well as answer sheets, score keys, and an interim manual. (RS)

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ACER

APPLIED READING TEST

FORM A

EDS 26865

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DIRECTIONS

This is a test of ability to read and understand written material. There are six passages of text within this test, and 32 questions which relate to these passages. Your task is to read each passage, read the questions that follow the passage, and choose the **one best** answer from the four options (A, B, C and D) provided for each question. Then, on the separate answer sheet, mark your answer to each question by using a pencil to fill in the box under the appropriate letter, A, B, C or D.

After you have read the example passage below, read practice question P1 which follows it, choose the best answer, and mark it in the Practice Examples section of the separate answer sheet. Then do the same for practice questions P2 and P3.

EXAMPLE PASSAGE

The basic materials in bricklaying are bricks and mortar. Bricks are usually made of clay, and mortar is usually made of water, sand, and cement and/or lime. The purpose of mortar is to join separate bricks into one solid mass.

P1 Bricks are usually made of

- A clay.
- B wood.
- C metal.
- D plastic.

P2 What are the basic materials in bricklaying?

- A glass and putty
- B bricks and mortar
- C pipes and adhesives
- D electrical components

P3 Mortar is used to

- A decorate brick structures.
- B prevent bricks sticking together.
- C reduce the weight of brick structures.
- D join separate bricks into one solid mass.

Answer each question **only** by referring to the information in the relevant passage. Work as quickly as you can without making mistakes. If you wish to change an answer, erase your first mark completely and mark your new answer clearly. Please do not make any other marks on the answer sheet.

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Fitting Gaskets

When fitting a new gasket, treat the gasket with care to avoid damage. The surfaces of parts should be clean, and all traces of the old gasket removed. Surfaces may be checked for flatness, and rough areas should be removed by draw-filing with a smooth flat file. The gasket may be held in place by means of light grease or oil, and this is often applied to both sides of the gasket to assist in initial sealing. The tightening of the holding studs should be gradual and even. A torque wrench should be used particularly on cylinder heads, and where torque specifications are given for other parts.

Cylinder Head Gasket

This is the most important gasket in the motor vehicle; it is subjected to the greatest heat and pressure. It must provide a good seal against both water and combustion gases, as even a small leakage can have serious consequences. Replacing the cylinder head gasket requires attention to detail and the following additional points should be observed.

- (a) Before installing the gasket it is essential that the cylinder head and cylinder block faces are clean. Carbon should be scraped off, but sharp-edged scrapers which might scratch the faces should not be used.
- (b) Small rough areas are invariably found on the surfaces of cylinder blocks and heads. Correct use of a fine flat file can satisfactorily remove these rough areas and still preserve a good surface finish.
- (c) Final cleaning and polishing can be done with a wire brush in a portable electric drill.

1 The appropriate tool for draw-filing is a

- A smooth flat file.
- B sharp-edged scraper.
- C special automotive file.
- D wire brush in a portable electric drill.

2 The passage states that the cylinder head gasket is the most important gasket in a motor vehicle because

- A it is the largest gasket in a motor vehicle.
- B it is exposed to more carbon than other gaskets.
- C it is subjected to more heat and pressure than other gaskets.
- D torque specifications are always provided for cylinder heads.

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- 3 Carbon deposits on a cylinder block face should be
- A burnt off.
 - B scraped off.
 - C removed by draw-filing.
 - D removed by applying light grease or oil.
- 4 A torque wrench should be used
- A only on cylinder heads.
 - B on all motor components.
 - C on cylinder heads, but only when torque specifications are provided.
 - D on all cylinder heads, and on other parts when torque specifications are provided.
- 5 What action should be taken if rough areas are found on the surfaces of parts where an old gasket has been?
- A The rough areas should be removed by draw-filing.
 - B The holding studs should be tightened gradually and evenly.
 - C Grease or oil should be applied to both sides of the new gasket.
 - D The rough areas should be removed with a wire brush in a portable electric drill.

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DAILY MAINTENANCE INSTRUCTIONS

Preventative machine maintenance means maintaining a machine in such good working condition that a breakdown is unlikely. It involves a definite maintenance program and calls for the complete co-operation of management and staff.

Because most machines involve high initial costs, management is particularly interested in this aspect of workshop organisation. Loss of money and production delays are directly brought about when a machine is out of operation.

Employers invariably expect machine operators to give their machines the basic attention necessary for the faithful production of work. This is to ensure that the desired degree of accuracy and an efficient rate of work are maintained.

Machine maintenance should be carried out by the operator regularly and methodically, in accordance with a set schedule, and recorded on a chart kept for each machine.

The schedule should include:

- the type and number of oiling points, the type of lubricant required for each, and how frequently oiling is necessary;
- a list of checks for wear of slides and bearings, etc.; and
- simple checks of the accuracy of operation of the machine.

In addition, details of any major overhaul performed by a tradesperson should be recorded on the reverse side of the chart. These entries should include the signature of the tradesperson and the time he/she spent doing the work.

Such a chart provides an accurate record covering the life of the machine. It is of great value to management when assessing and comparing the relative efficiency of various makes of machine.

6 According to the instructions, management is particularly interested in

- A securing good tradespersons.
- B buying machinery at low cost.
- C maintaining machines in good working order.
- D the operator's ability to overhaul machines.

7 According to the instructions, employers expect their machine operators to

- A assess the efficiency of machines.
- B carry out basic machine maintenance.
- C undertake major overhauls of machines.
- D make modifications to machines, if required.

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- 8 The main aim of preventative machine maintenance is to
- A eliminate major overhauls.
 - B reduce the chance of breakdowns.
 - C increase the accuracy of the machine.
 - D cut down the high initial costs of machinery.
- 9 According to the instructions, management receives valuable information about the efficiency of different makes of machines from
- A maintenance charts.
 - B operators' comments.
 - C maintenance schedules.
 - D records of overhaul costs.
- 10 According to the instructions, two items of information which are to be included in the record of a major overhaul are the
- A tradesperson's signature and the cost of the overhaul.
 - B accuracy of the machine and the time taken for the repair.
 - C time taken for the repair and the tradesperson's signature.
 - D the cost of the overhaul and the type of lubricant required.
- 11 The instructions state that, on the back of the machine maintenance chart, a record should be kept of
- A details of machine overhauls.
 - B the routine for daily maintenance.
 - C checks for correctly performed operations.
 - D results of checks on accuracy of the machine.
- 12 The main purpose of keeping a machine maintenance chart is to have access to information about the
- A working life of a machine.
 - B frequency at which a machine is oiled.
 - C rate of wear and tear of machine parts.
 - D number of major overhauls a machine has had.

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MEMORANDUM

TO: Workshop Employees
FROM: Safety Officer - N. Joyce
TITLE: Safety - Electrical Accidents

There was an electrical accident at the Smithfield Factory last week which resulted in two deaths. The second death could have been avoided if the correct procedure for the handling of electrical accidents had been followed.

The following is an outline of the procedure to be followed when an electrical accident occurs. The safety manual has a complete account of the procedure to be implemented.

- (a) Assess the situation - **do not** touch the body or the clothing as they are likely to be electrified.
- (b) If it is possible to do so quickly, switch off the electrical circuit.
- (c) Find out where the victim comes into contact with the electric current.
- (d) The method of freeing the victim from the current will depend on whether it is a high or low voltage current, but in either case a dry, non-conductive material must be used to free the victim.
- (e) Make the separation between the victim and the current as quickly as possible, using one movement. It will take some considerable force, so be prepared for this.
- (f) When the victim has been removed from the electric current, check the victim's heartbeat and breathing. If one or both have stopped, make an immediate attempt to resuscitate.

13 Once the victim has been freed from the electric current, the next step is to

- A apply external heart massage.
- B give mouth-to-mouth resuscitation.
- C check the victim's breathing and heartbeat.
- D determine whether the current was high or low voltage.

14 According to the memorandum, the second death at the Smithfield Factory occurred because the

- A correct procedure was not followed.
- B workers had not read the safety manual.
- C electric shock was particularly severe.
- D victim was not resuscitated immediately.

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- 15 For full details concerning the handling of an electrical accident, the memorandum tells
- A the Safety Officer to see N. Joyce.
 - B employees to see the Safety Officer.
 - C employees to look at the safety manual.
 - D the Safety Officer to read the memorandum.
- 16 The memorandum warns that although it is necessary to act quickly in the case of electric shock, it is also necessary to
- A have a safety manual close at hand.
 - B first determine the cause of the accident.
 - C obtain assistance before taking any action.
 - D let the Safety Officer handle the situation.
- 17 What is the first step to take when a person suffers an electric shock?
- A free the victim from the electric current
 - B determine the best course of action to take
 - C check to see if the victim is breathing and has a heartbeat
 - D find out where the victim comes into contact with the electric current
- 18 Which one of the following statements is accurate with respect to different voltage levels (i.e. high or low) in an electrical accident?
- Different voltage levels
- A determine whether or not the victim should be moved.
 - B make no difference to the method used to dislodge the victim from the current.
 - C determine whether or not the victim's clothing will be electrified.
 - D make no difference to the material used to dislodge the victim from the current.

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Insulation

Pipes are insulated to reduce heat loss and heat gain. Insulation also helps to prevent moisture forming on pipes carrying substances.

The insulation material is surrounded by canvas or aluminium foil and is attached to the pipes by wires, straps or adhesives.

The insulation on pipes should have no gaps, especially at sections where pipes extend through wall, floor and ceiling openings.

At locations such as bends, fittings and joints, the insulation material is cut and shaped on site.

There are specific hazards involved when handling insulation. You must be aware of them. You will need to know what protective clothing to wear, how to handle insulation materials and what to do when a hazardous situation arises. For example, some insulation materials will cause irritation to the skin on contact.

Insulation materials have different resistance levels, and different reactions, to fire. Some materials are very heat resistant and others give off toxic fumes. Therefore, it is important that you assess which insulation material is best suited to a specific task.

- 19 The passage states that pipes are insulated to
- A protect against leaks.
 - B help moisture to form on the pipes.
 - C keep their temperature as even as possible.
 - D reduce the number of fires in the workplace.
- 20 Which one of the following statements about the reaction of insulation materials to fire is most accurate?
- A All insulation materials are equally fire resistant.
 - B When heated, all insulation materials give off toxic fumes.
 - C Insulation materials do not protect pipes when there is a fire.
 - D Insulation materials differ in their capacity to withstand fire.
- 21 According to the passage, the insulation on pipes that pass through structures like walls, ceilings and floors should be
- A dry.
 - B flexible.
 - C continuous.
 - D very heat resistant.

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- 22 According to the passage, which one of the following materials is in direct contact with pipes?
- A canvas
 - B adhesive tape
 - C aluminium foil
 - D insulation material
- 23 The passage states that a minor function of insulation material is to
- A reduce heat loss or heat gain.
 - B prevent moisture forming on pipes.
 - C provide support for pipes at bends, fittings and joints.
 - D provide protection from materials which can cause skin irritation.

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Beating Egg Whites

The shape of the bowl affects the ease of whipping egg whites and also the type and volume of foam produced. A bowl with a small rounded base that slopes out to a wider top is desirable. The beater should fit the base of the bowl.

The type of beater also affects the characteristics of the beaten egg white. Rotary beaters turned by hand have proved less effective than electric mixers with twin beaters. Still better results have been achieved with electric beaters which move around the bowl. Results are variable with old-fashioned flat wire whips.

Whatever the type of beater, the extent to which the egg white is beaten is very important. After a little beating, the egg white looks frothy or slightly foamy with large air bubbles on the surface. As beating is continued, the foam becomes stiffer and the air cells smaller.

At first the foam is very shiny and flows when the bowl is tipped. The foam forms rounded peaks when the beater is withdrawn. Further beating produces small air cells, a whiter foam, and a moist appearance. At this stage the foam is considered to be stiff but not dry and is ideal for use in cakes, omelettes, souffles, and similar products.

Additional beating produces a dry foam that is rigid and almost brittle. The appearance is very white but dull, and the egg whites are overbeaten for most purposes. Such egg whites do not expand well in the heat of the oven because the cell walls are too rigid.

24 According to the passage, which of the following are important factors in the beating of egg whites?

- (i) the size of the eggs
- (ii) the shape of the bowl
- (iii) the extent of beating
- (iv) the type of beater used

- A (i) and (ii) only
- B (i), (iii) and (iv)
- C (ii), (iii) and (iv)
- D (iii) and (iv) only

25 Egg white foam which is stiff but not dry is

- A suitable for use in cakes.
- B overbeaten for most purposes.
- C ideal for use in all food products.
- D slightly foamy with large air bubbles on the surface.

GO STRAIGHT ON TO THE NEXT PAGE

- 26 Overbeaten egg white foam
- A is very white and has a moist appearance.
 - B is unsuitable for use in any food products.
 - C does not expand well in the heat of the oven.
 - D forms rounded peaks when the beater is withdrawn.
- 27 According to the passage, what kind of beater is best for beating egg whites?
- A a rotary beater turned by hand
 - B an old-fashioned flat wire whip
 - C an electric mixer with twin beaters
 - D an electric mixer which moves around the bowl
- 28 Which of the following are desirable characteristics in a bowl used for beating egg whites?
- (i) wide, shallow shape
 - (ii) a small rounded base
 - (iii) a base which fits the beater well
- A (i) and (iii) only
 - B (ii) only
 - C (ii) and (iii) only
 - D (i), (ii) and (iii)

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Table 1: Class of Fire and Use of Fire Extinguishers

	CLASS OF FIRE		
	A	B	C
NATURE OF COMBUSTIBLE MATERIAL	Common combustible materials (dry) - e.g. wood, cloth, packing materials.	Flammable liquids - e.g. kerosene, petrol, thinners, paint, lacquers, alcohol, grease, fat, wax, oil.	Live electrical equipment - e.g. light fittings, generators, motors, wiring, computers.
METHOD OF EXTINGUISHING	Cooling and dampening - e.g. with water from a hose or bucket.	Blanketing or smothering the fire to exclude oxygen.	Blanketing or smothering the fire to exclude oxygen.
TYPE OF FIRE EXTINGUISHING AGENT TO USE	Water, foam.	Carbon dioxide (CO ₂), dry powder chemical, foam (when the flammable liquid might re-ignite).	Vaporising liquid (BCF), carbon dioxide (CO ₂), dry powder chemical.
OTHER NOTES	Other extinguishing agents will put out Class A fires but are not as effective as water. Water is most suitable for penetrating deep-seated fires and cooling materials so that they will not re-ignite.	Never use water on Class B fires, as it might spread the burning liquid.	The extinguishing agent must be a non-conductor of electricity. Never use foam or water on Class C fires. Proper protection must be worn when using vaporising liquid, as this gives off toxic gas on contact with flame.

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- 29 A foam extinguisher should not be used on a fire in
- A garden refuse.
 - B a computer room.
 - C a paint warehouse.
 - D an office rubbish bin.
- 30 Which of the following characteristics are true of dry powder chemical extinguishers?
- (i) can be used on Class B fires
 - (ii) are particularly suitable for Class A fires
 - (iii) contain an electrically non-conductive extinguishing agent
- A (i) and (ii) only
 - B (i) and (iii) only
 - C (ii) and (iii) only
 - D (i), (ii) and (iii)
- 31 Should a carbon dioxide (CO₂) extinguisher be used to put out a small Class A fire?
- A no, not in any circumstances
 - B yes, in all circumstances
 - C yes, but only if proper protective clothing is worn
 - D yes, but only if a foam or water-type extinguisher is not available
- 32 Which of the following characteristics are true of vaporising liquid (BCF) extinguishers?
- (i) can be used on live electrical equipment
 - (ii) can be used in all the same circumstances as dry powder chemical extinguishers
 - (iii) can be used in circumstances in which foam and water-type extinguishers cannot be used
- A (i) and (ii) only
 - B (i) and (iii) only
 - C (ii) and (iii) only
 - D (i), (ii) and (iii)

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APPLIED READING TEST

FORM B

DIRECTIONS

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EXAMPLE PASSAGE

The basic materials in bricklaying are bricks and mortar. Bricks are usually made of clay, and mortar is usually made of water, sand, and cement and/or lime. The purpose of mortar is to join separate bricks into one solid mass.

P1 Bricks are usually made of

- A clay.
- B wood.
- C metal.
- D plastic.

P2 What are the basic materials in bricklaying?

- A glass and putty
- B bricks and mortar
- C pipes and adhesives
- D electrical components

P3 Mortar is used to

- A decorate brick structures.
- B prevent bricks sticking together.
- C reduce the weight of brick structures.
- D join separate bricks into one solid mass.

Answer each question **only** by referring to the information in the relevant passage. Work as quickly as you can without making mistakes. If you wish to change an answer, erase your first mark completely and mark your new answer clearly. Please do not make any other marks on the answer sheet.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

MEMORANDUM

TO: Workshop Supervisor
FROM: Department Head - P.S. Cook
SUBJECT: Safe Machine Operation

Over the past few months there has been an increase in the number of workshop accidents involving machines. This suggests to me that personnel are not familiar with the safety rules for machine use. In order to rectify this situation, make sure that the following summary from the safety manual is brought to the attention of your workshop personnel and direct them to read the relevant section in the safety manual.

Guidelines for machine operation

- (a) First check that guards on machines are in place and working. If either of these conditions is not met, report the fault immediately and **do not** operate the machine.
- (b) Machine guards must not be removed unless the workshop supervisor so directs.
- (c) Work materials to be machined should be held in place by appropriate equipment such as a vice - **not** by hand.
- (d) When removing cuttings or rubbish from a machine, ensure that the machine is not operating. Use either a brush or hook - **do not** use your hands.
- (e) **Do not** switch off the machine at the power point. Switch it off at the machine switch.

1 The memorandum was prepared in response to

- A complaints from senior management.
- B complaints from workshop personnel.
- C an increase in the level of damage to machines.
- D an increase in the number of workshop accidents.

2 The memorandum states that workers should

- A switch their machines off at the power point.
- B know the guidelines for safe machine operation.
- C know about the number of accidents that have occurred.
- D have the workshop supervisor check their machines for safety.

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- 3 The memorandum states that rubbish should be removed from the machine by
- A hand only.
 - B brush only.
 - C hook or brush.
 - D the workshop supervisor.
- 4 The main purpose of the memorandum is to
- A outline the disadvantages of machines.
 - B draw attention to basic principles of safe machine operation.
 - C inform the workshop supervisor that he/she has been negligent.
 - D discuss the efficiency of machine operation with the workshop supervisor.
- 5 According to the memorandum, if a machine guard is faulty then the machine must
- A not be operated.
 - B be replaced immediately.
 - C only be operated by experienced workshop personnel.
 - D be used under the guidance of the workshop supervisor.
- 6 The memorandum instructs the workshop supervisor to
- A take responsibility for switching off all machines.
 - B take disciplinary action against negligent workshop personnel.
 - C insert new guidelines for machine operation in the safety manual.
 - D direct workshop personnel to read the relevant section in the safety manual.

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Introduction to Soldering

Soldering is a term applied to the fastening together of two metals, either similar or dissimilar. Soldering fastens two metals together without melting either one of them.

The theory of soldering is that the joining metal (solder), upon becoming molten, adheres to the parent metal by means of molecular attraction. The molecules of solder entwine with the parent metal molecules and form a very strong bond, this being an example of the process of adhesion.

In soldering, the joining metal melts and flows at temperatures less than 425°C . If the joining metal flows above 425°C , then the process is called brazing.

Common Solders

Common solders are made of lead and tin, the properties of five types being shown in Table 1. As a general rule, the percentage of lead is listed first. Solder will start melting at approximately 183°C , and will flow freely at the flow temperature. The 60-40 and 70-30 solders stay plastic (between melting and flow temperature) over a wide temperature range.

Table 1: Composition and Plastic Range of Common Solders

Composition		Plastic Range	
Lead (%)	Tin (%)	Melting Temperature ($^{\circ}\text{C}$)	Flow Temperature ($^{\circ}\text{C}$)
38	62	183	183
40	60	183	188
50	50	183	216
60	40	183	240
70	30	183	260

- 7 According to the passage, the difference between soldering and brazing is that brazing
- A takes place at a higher temperature.
 - B melts one or both of the parent metals.
 - C is not based upon molecular attraction.
 - D cannot fasten together different metals.

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- 8 The plastic range of a solder refers to the difference between the
- A melting temperature and flow temperature of the solder.
 - B melting temperature and flow temperature of the parent metal.
 - C melting temperature of the solder and the melting temperature of the parent metal.
 - D flow temperature of the solder and the flow temperature of the parent metal.
- 9 According to Table 1, which one of the following common solders has the greatest plastic range?
- A 40-60
 - B 50-50
 - C 60-40
 - D 70-30
- 10 Which of the following occur during the process of soldering?
- (i) the solder melts
 - (ii) the parent metals melt
 - (iii) the molecules of the solder and the parent metals form a very strong bond
- A (i) and (ii) only
 - B (i) and (iii) only
 - C (ii) and (iii) only
 - D (i), (ii) and (iii)
- 11 Which of the common solders listed in Table 1 could be used for brazing?
- A 38-62
 - B 70-30
 - C all of the solders listed in Table 1
 - D none of the solders listed in Table 1
- 12 According to Table 1, which of the following characteristics are true of 60-40 solder?
- (i) contains more tin than lead
 - (ii) greater plastic range than most other common solders
 - (iii) higher flow temperature than most other common solders
- A (i) and (ii) only
 - B (i) and (iii) only
 - C (ii) and (iii) only
 - D (i), (ii) and (iii)

GO STRAIGHT ON TO THE NEXT PAGE

Operation of Auto-Chef Microwave Oven Control Panel

The Auto-Chef microwave oven uses a microprocessor, an electronic unit that provides a wide variety of cooking programs which could not be achieved by conventional control methods. The oven is operated by pressing the appropriate buttons on a control panel. An illuminated digital display shows the cooking time, time of day or minute timer. Indicators located below the digital display show the various cooking settings and the cooking function which has been programmed by the operator.

An entry signal tone should be heard each time you press a button on the control panel and make a correct entry. If you do not hear this sound it means that:

- you have not used enough pressure in pressing the button;
- you have made more entries than the control panel will accept; or
- you have made an incorrect entry.

An audible signal will also sound for approximately two seconds at the end of the cooking cycle.

- n.b.
- You cannot program the oven if the door is not closed tightly.
 - During cooking, the program cannot be changed until the STOP/CLEAR button is pressed. All functions are locked in to prevent accidental changes.
 - If the electrical power supply to the microwave oven is interrupted, all indicators will light and the digital display will flash on and off once every second after the power is reinstated. If this occurs during cooking, the program will be erased. The time of day will also be erased. Simply reset the clock for the correct time of day.

13 If you hear a signal that lasts for approximately two seconds, this means that

- A the clock needs to be reset.
- B the STOP/CLEAR button has not been pressed.
- C you have reached the end of the cooking cycle.
- D you have made more entries than the control panel will accept.

14 According to the passage, the Auto-Chef microwave oven uses a microprocessor to

- A make operation of the oven very simple.
- B provide a wide variety of cooking programs.
- C shorten the amount of time required for cooking.
- D minimise the amount of energy required in cooking.

GO STRAIGHT ON TO THE NEXT PAGE

- 15 If you wish to change the program during cooking, the first thing you should do is
- A press the STOP/CLEAR button.
 - B open the oven door and reset the clock.
 - C wait until the current cooking cycle is completed.
 - D press the appropriate buttons for the new program on the control panel.
- 16 The passage states that failure to close the oven door tightly results in
- A inability to program the oven.
 - B danger to the operator of the oven.
 - C an increase in the amount of time required for cooking.
 - D automatic cut-off of the electrical power supply to the oven.
- 17 Where is cooking time displayed on the Auto-Chef microwave oven?
- A under the indicators
 - B on the control panel
 - C on the electronic quartz clock
 - D on the illuminated digital display
- 18 What is the immediate result of making an incorrect entry when pressing a button on the control panel?
- A The entry signal tone will not be heard.
 - B The STOP/CLEAR button will need to be pressed.
 - C The indicators will show that an incorrect entry has been made.
 - D All indicators will light and the digital display will flash on and off once every second.

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INSPECTIONS OF WIRING AND EQUIPMENT

Regular inspections must be carried out during the installation of wiring and equipment. The inspections involve assessment of the condition of the wiring, equipment and circuitry. There are a number of reasons for conducting regular inspections. First, it avoids wasting time working on faulty equipment. Second, it reduces possible heavy costs. Third, it avoids having to make adjustments at a later stage.

Before the power supply is connected, a final inspection must be carried out. The tradesperson has to make sure that:

- the wiring is suitable for the load;
- circuit wiring is continuous and connected;
- appropriate protective devices have been installed;
- there will be no unnecessary leakage of electric current;
- there is a continuous and complete earthing system; and
- all work conforms with the relevant rules, regulations and codes.

Similar inspections are carried out routinely on existing wiring and equipment. If a fault is detected, it has to be isolated immediately. When repairs have been completed and before the power supply is connected, a final inspection must be carried out.

19 Testing of existing wiring and equipment occurs

- A on a regular basis.
- B about every twelve months.
- C only at the request of the owner.
- D only when a fault has been reported.

20 Once repairs to existing wiring and equipment have been completed, the next step is

- A a check of the protective devices.
- B the connection of the power supply.
- C an inspection of the wiring and equipment.
- D a check of the load to be placed on the wiring.

GO STRAIGHT ON TO THE NEXT PAGE

- 21 Testing carried out on existing wiring and equipment is
- A less detailed than testing carried out on new wiring and equipment.
 - B practically the same as testing carried out on new wiring and equipment.
 - C more detailed than testing carried out on new wiring and equipment.
 - D relatively time-consuming, as there are more faults in existing wiring and equipment than there are in new wiring and equipment.
- 22 Some items checked during the final inspection are the
- A earthing system, power supply and wiring load.
 - B circuit wiring, protective devices and earthing system.
 - C equivalence of new and old installations, and the adequacy of wiring.
 - D cost of the installation, and adherence to relevant rules, regulations and codes.

GO STRAIGHT ON TO THE NEXT PAGE

The Control and Safe Handling of Radioactive Sources Used in Radiation Therapy

In certain medical treatments, the use of sealed radioactive sources that emit beta or gamma rays is well established. As the use of these sources means that persons other than the patient may be exposed to the radiations emitted, a balance has to be reached between possible harmful effects of this exposure and the practical advantages of the treatment for the patient.

When not in use, radioactive sources should be kept in a fixed safe or store, located as far from occupied areas as possible, and used for this purpose only. The safe should be secure against tampering, and shielded so that the radiation outside it is kept at an acceptably low level. There should be a prominent sign outside the safe to indicate that it contains radioactive material.

A register shall be kept of all sealed sources held. The register should include:

- the serial number or other identification of each source;
- the physical or chemical form of the radioactive material;
- the date of receipt and the activity of the source on that date;
- the location of the source when not in the safe or store; and
- once the source is disposed of, the date and manner of disposal.

All handling of radioactive sources should be carried out as quickly as possible, compatible with safe working practice. Sealed radioactive sources shall not be picked up with the fingers. All such sources shall be moved with long-handled forceps or other suitable instruments. The use of lead-rubber gloves is not recommended, as they provide almost no protection against gamma rays and handicap the operator.

23 Sealed sources of radioactive material are used in medical practice to

- A provide power for medical equipment.
- B deter people from tampering with safes.
- C provide radiation for treatment of patients.
- D counter the effects of beta rays and gamma rays.

24 Which of the following statements are accurate with respect to handling of radioactive sources?

Radioactive sources should be handled

- (i) with the fingers.
- (ii) with lead-rubber gloves.
- (iii) with long-handled forceps.
- (iv) as quickly as possible, compatible with safe working practice.

- A (i) and (iv)
- B (ii) and (iv)
- C (iii) only
- D (iii) and (iv)

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- 25 When persons other than a patient may be exposed to radiations from a sealed source during treatment, then
- A the treatment must be discontinued.
 - B the source must be disposed of immediately.
 - C the radiation must be restricted to an acceptably low level.
 - D a prominent sign should be set up to indicate the presence of radioactive material.
- 26 Which of the following are true of safes in which radioactive sources are kept?
- (i) should be secure against tampering
 - (ii) should only be used for storage of radioactive sources
 - (iii) should be located as far from occupied areas as possible
 - (iv) should be shielded to keep radiation outside at an acceptably low level
- A (i), (ii) and (iii) only
 - B (i) and (iii) only
 - C (ii) and (iv) only
 - D (i), (ii), (iii) and (iv)

GO STRAIGHT ON TO THE NEXT PAGE

MIXING BREAD

Most homemade bread is mixed as a straight dough, which means that all of the ingredients are added before the dough is allowed to rise. It is convenient to add the flour to the liquid so that the dough can be adjusted to the correct consistency. It is often recommended that the ingredients be beaten well after half of the flour has been added.

At this point it is easy to beat the mixture thoroughly, either by hand or with an electric mixer. All of the flour can be added at once into industrial mixers and heavy duty household mixers that have a dough hook. Kneading is unnecessary after dough has been mixed adequately on such machines. When an ordinary household electric mixer is used, mixing cannot be completed by machine because the motor is likely to overheat. The remaining flour is stirred in, and then the dough is kneaded.

At the beginning of the kneading period, dough tends to cling to the board, but, as it is worked, water is taken up by the dough and it becomes stiffer. If kneading is done with a light motion and tearing of the dough is avoided, the dough does not stick to the board after it has been kneaded a few strokes. The dough is kneaded lightly but thoroughly until the dough feels soft and pliable.

Dough that has been kneaded sufficiently is satiny and smooth, and silvery blisters may be noted just under the surface when the ball of dough is turned in the light. When mixing is done by hand, it is much more likely that the dough will be undermixed than overmixed. It is easy to overmix dough only when a heavy duty electric mixer is used.

- 27 When should the ingredients in a bread mixture be beaten well?
- A before the dough is allowed to rise
 - B when an electric mixer is available
 - C after half of the flour has been added
 - D when the dough is at the correct consistency
- 28 When mixing bread, the flour should be added to the liquid so that
- A kneading becomes unnecessary.
 - B the ingredients can be beaten well.
 - C the dough can be adjusted to the correct consistency.
 - D all of the ingredients can be added before the dough rises.

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- 29 During kneading, which of the following help stop dough clinging to the board?
- (i) working of the dough
 - (ii) tearing of the dough
 - (iii) a light kneading motion
- A (i) only
B (i) and (iii) only
C (ii) and (iii) only
D (i), (ii) and (iii)
- 30 Which of the following are true when beating bread mixture with an ordinary household electric mixer?
- (i) Kneading is unnecessary.
 - (ii) It is easy to overmix the dough.
 - (iii) Mixing cannot be completed by machine.
 - (iv) The flour should not all be added in at once.
- A (i) and (ii) only
B (i), (ii) and (iv)
C (ii), (iii) and (iv)
D (iii) and (iv) only
- 31 Silvery blisters seen just under the surface of a ball of dough are an indication that the dough
- A needs more liquid.
 - B has been overmixed.
 - C contains too much air.
 - D has been kneaded sufficiently.
- 32 Which of the following can be regarded as heavy duty mixers?
- (i) industrial mixers
 - (ii) ordinary household mixers
 - (iii) household mixers that have a dough hook
- A (i) only
B (i) and (iii) only
C (iii) only
D (i), (ii) and (iii)

CHECK BACK OVER YOUR WORK

ACER
APPLIED
READING
TEST
FORMS A&B

MANUAL
INTERIM

ACER Applied Reading Test

INTERIM MANUAL

J.M. van den Berg
I.R. Woff

ACER

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This Interim Manual has been released to provide users with access to
the ACER Applied Reading Test at the earliest opportunity, based upon
the observation that a new test of reading ability is urgently required in
the trade and technical areas. A final version of the Manual will be
released as soon as possible, pending the availability of further data.

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Introduction

Description of the Test

The ACER Applied Reading Test is a group test of ability to read and understand technical reading material, such as would be encountered within a technical or trade training course or "on the job" in a technical or trade position. Performance on the test is intended to be independent of technical knowledge and reading speed. Passages of text from a wide range of technical and trade areas are to be read by candidates, each followed by a number of questions (items) which are based upon the passage. Responses to the questions indicate whether or not text from the passage has been read and understood.

The test contains six passages and 32 items, has a 30-minute time limit, and is presented in a reusable multiple choice test booklet with four response alternatives (A, B, C and D) for each item. Answers are marked on a separate optical mark recognition (OMR) answer sheet which may be scored with an OMR scoring machine or by hand, using a transparent overlay score key. Reference group data are provided as percentile ranks and stanines, with associated descriptive ratings. T-scores and z-scores are also provided. Two parallel forms of the test, Form A and Form B, are available.

Uses of the Test

The ACER Applied Reading Test was designed for use in the selection of apprentices, trainees, technical and trade personnel, and any other persons who need to read and understand text of a technical nature. With the advantage of high face validity for technical and trade occupations, it is hoped that the test will also find application in the counselling of individuals who work within or aspire to these occupations, and in the identification of those apprentices and other technical students who would benefit from remedial assistance with reading.

Development of the Test

Origins of the Test

The ACER Applied Reading Test was developed primarily in response to requests from apprentice trainers who identified lack of ability to read and understand technical reading material as a major problem in the training and retention of apprentices. Given that the few existing tests in this area have been used heavily, and that none of these tests have been developed locally, it was decided that an Australian test of this ability should be developed.

Writing and Panelling of Passages and Items

Passages for the ACER Applied Reading Test were prepared by the authors and a consultant. To make the passages as representative as possible of the real-world technical written material with which persons in the trade and technical occupations are expected to cope, the passages were adapted from actual technical texts, training manuals and documents encountered "on the job", or were written in a similar style. Different types of passage were developed, including passages set out in the style of company memoranda and passages set out as tables of information, to represent a range of the presentation formats and reading and interpretation skills required in the technical and trade occupations. The passages were also drawn from a wide range of technical and trade areas so that the influence of prior knowledge in a particular area would be minimized. Technical terms which might not be familiar to all candidates were excluded for similar reasons. Items based upon the passages were written concurrently.

Following extensive panelling, 12 passages and 72 items were approved or successfully revised. The passages and items were then divided into two trial forms, Trial Form A and Trial Form B, on the basis of the judgement of one of the authors. Passages and items were allocated so that content was most evenly distributed between the two forms (e.g. one memorandum-style passage and one table-based passage in each form), and so that estimated average item difficulty level was as similar as possible between the two forms while ensuring that each contained the same number of passages and items (six and 36, respectively). The passages within each trial form and the items within each passage were then ranked in increasing order of estimated difficulty.

Trial Testing

The two trial forms were administered to a sample of technical school students and apprentices. The sample comprised 46 Year 11 students from a Melbourne technical school and four pre-apprenticeship students and 103 apprentices (33 first year, 36 second year, and 34 third year) from two Melbourne colleges of Technical And Further Education (TAFE). The apprentices were drawn from as broad a spread of trades as could be obtained at the time, with 56 being drawn from electrical engineering, 24 from mechanical engineering/welding, and 23 from plumbing. The sample was predominantly male.

The two trial forms were randomly allocated to subjects within each trial testing session, achieving sample sizes of 76 subjects for Trial Form A and 77 subjects for Trial Form B. A time limit of up to 45 minutes was used, as it was expected that this would allow sufficient time for almost all subjects to attempt all items.

Item Analysis of Trial Forms

Subsequent to trialling, item analyses were carried out using a conventional item analysis program. On the basis of item analysis, items were generally discarded if the facility level was higher than 95 per cent or lower than 25 per cent (i.e. if the item appeared to be too easy or too difficult to discriminate satisfactorily), or if the point-biserial correlation (r_{pb}) fell below .20 (i.e. if the item did not give sufficient indication of measuring the construct of relevance to the test). All distractors (i.e. incorrect response alternatives) which received a positive r_{pb} were amended in order to be rendered more clearly incorrect. All distractors which did not receive endorsement were amended, where possible, or replaced in order to achieve more plausible distractors.

Four items from Trial Form A and four items from Trial Form B did not meet the criteria for acceptability and were therefore excluded from the final forms of the test. Each passage retained at least four items, which was considered the minimum number of items for retention of a passage, so all 12 passages and 64 items were therefore included in the final forms.

Preparation of Final Forms

Passages were allocated to two final forms, Form A and Form B, such that both forms were matched as closely as possible for passage content, mean item facility level, mean item r_{pb} , number of passages (six per form), and number of items (32 per form). For each passage, items were arranged in increasing order of item facility level, and within each form, passages were similarly arranged in increasing order of mean facility level of items associated with each passage.

From direct observation during trial testing, it was apparent that more than 90 per cent of subjects completed either trial form in less than 30 minutes. On these grounds, and given that the final forms of the test are four items shorter than the trial forms, a time limit of 30 minutes was considered sufficient to allow almost all candidates to attempt all items, making performance on the test largely independent of reading speed.

Preparation for Administration

As early as possible prior to the date of test administration, the following steps should be followed.

- 1 The supervisor should read this manual and become thoroughly familiar with its contents, particularly the Directions for Administration.
- 2 Prospective candidates should be notified that they must bring an HB pencil and an eraser to the testing session (or, if these items are to be provided for candidates, quantities should be checked against the number of prospective candidates).
- 3 Quantities of test booklets and answer sheets should be checked against the number of prospective candidates (if the test booklets have been used before, they should also be checked to ensure that they have not been defaced by previous candidates).
- 4 Arrange for a well-lit, well-ventilated room in a quiet location to be available for the testing session. The room should be large enough to hold all candidates comfortably. To keep the testing session free of noise and interruptions, preparation of a sign worded "TESTING IN PROGRESS - DO NOT DISTURB" is recommended.
- 5 If there are more than 25 prospective candidates, arrange for the supervisor to have one assistant per additional 25 candidates or part thereof (e.g. 90 candidates would require one supervisor and three assistants). Such large groups may also require the use of a public address system for delivery of administration instructions.
- 6 Arrange seating within the test room so that candidates cannot easily see each others' answers, and so that the supervisor (and any assistants) can move around the room freely.
- 7 Ensure that the following materials will be available at the testing session:
 - a copy of this manual;
 - a stopwatch, or a watch or clock with a second hand or display, and;
 - a supply of spare HB pencils and erasers.
- 8 Allow 40-45 minutes for the test session, as the test has a 30 minute time limit, and the initial instructions, practice questions, etc., require an additional 10-15 minutes.

Directions for Administration

Preliminary Instructions

- 1 To ensure that the test is administered under standard conditions, the detailed instructions below should be followed exactly.
- 2 If HB pencils and erasers are to be provided for candidates, these can be placed on desks before candidates enter the test room or distributed with the test booklets and answer sheets.
- 3 The time limit for the test should be observed with the aid of a stopwatch, or a watch or clock with a second hand or display.
- 4 Once the test has commenced, the supervisor (and any assistants) should move around and ensure that instructions have been fully understood, that answers are being marked correctly, and that standard conditions are maintained.
- 5 Candidates' questions should be answered as far as possible by quoting from the detailed instructions. Requests for explanation of the content of test items should be answered with a response such as the following: "I'm sorry, but I cannot help you. Do the best you can".

Detailed Instructions

- 1 Once all candidates are seated, say:

This is a test to see how well you can read and understand written material. You will each be given a test booklet and an answer sheet on which to mark your answers. Do not open your test booklet or write on your answer sheet until you are told to do so.

Distribute test booklets and answer sheets, and ensure that each candidate has an HB pencil and an eraser.

- 2 Say:

Is there anyone who does not have a test booklet and answer sheet, or needs an HB pencil or eraser?

Distribute further materials, if necessary.

- 3 Say:

The answers to this test are to be marked on the separate answer sheet. It is important that you use an HB pencil for marking your answers to the test, as the machine used for scoring only responds to HB marks.

At the top left corner of the answer sheet, please fill in the details requested: your name, your address, and your age in years and months. (Pause) Below that, write down today's date - (say date). (Pause) In the top right corner of your answer sheet there is a large grid containing columns of alphabetical letters. There are thirteen empty boxes at the top of the grid. The first eleven boxes are for the letters of your surname, and the two boxes on the right are for the initials of your given names. If your surname is longer than eleven letters, you should only write the **first eleven** letters, and if you have more than two given names, you should only write the initials of the **first two**. You should use one box per letter, and leave out any spaces, hyphens or apostrophes. Write your name in the empty boxes at the top of the grid now. (Pause)

4 Say:

In the column below each letter of your name, you should make a heavy black mark in the box with the same letter. The mark should be a straight line through the middle of the box, and **not** a tick or cross. This should be done for all the letters in your name, using only one box per column. The example to the left of the grid shows how this would be done for the surname "Eade". If there is no letter at the top of a column, don't make a mark in that column. If you make a mistake, erase the error carefully before making your new mark. Make marks in all the columns under the letters of your name now.

Allow sufficient time for all candidates to complete the name grid. Move around the room, checking that the name grid is being completed correctly and providing assistance if necessary.

5 Say:

To the left of the name grid is a grid which says "Date of Birth". This is to be completed in the same manner, by writing the numbers of your date of birth in the empty boxes at the top of the grid and then marking the corresponding boxes below. Please be sure to include zeroes in your marking - for example, if you were born on the first day of a month, the two columns under "Day" would be "01". (Pause)

To the left of the name grid, please indicate your sex in the box marked "Sex". (Pause) Below that, please find the box marked "Test Form" and indicate Form (say "A" or "B", depending upon the form being used). (Pause)

All the questions in this test are contained in the test booklet, and all answers should be marked on the answer sheet in the appropriate boxes. Please don't make any marks on the test booklet. Now turn to page 3 of your test booklet and follow while I read the directions. (Brief Pause)

"This is a test of ability to read and understand written material. There are six passages of text within this test, and 32 questions which relate to these passages. Your task is to read each passage, read the questions that follow the passage, and choose the **one best** answer from the four options (A, B, C and D) provided for each question. Then, on the separate answer sheet, mark your answer to each question by using a pencil to fill in the box under the appropriate letter, A, B, C or D.

After you have read the example passage below, read practice question P1 which follows it, choose the best answer, and mark it in the Practice Examples section of the separate answer sheet. Then do the same for practice questions P2 and P3."

Allow sufficient time for all candidates to finish the practice examples. While candidates are working, check candidates' answer sheets to see that practice examples are being marked correctly.

6 Say:

The answer to practice question P1 is **A** - the passage states that bricks are usually made of **clay**, and this is answer A. The answer to practice question P2 is **B** - the passage states that the basic materials in bricklaying are **bricks and mortar**. The answer to practice question P3 is **D** - the passage states that mortar is used to **join separate bricks into one solid mass**. If you have made a mistake, erase the incorrect answer and mark the correct answer on the answer sheet. (Pause) Are there any questions?

Answer any questions raised.

7 Say:

Now look at the instructions at the bottom of the page while I read them aloud.

"Answer each question **only** by referring to the information in the relevant passage. Work as quickly as you can without making mistakes. If you wish to change an answer, erase your first mark completely and mark your new answer clearly. Please do not make any other marks on the answer sheet."

You will be allowed 30 minutes for this test. Throughout the test, be sure that the number on the answer sheet corresponds to the number of the question you are answering. If you break your pencil or have any problems during the test, please raise your hand. If you finish the test within 30 minutes, please check back over your work.

8 If you are using a stopwatch, prepare it for timing. Say:

Are you all ready? (Brief Pause) Turn to page 4 and begin work now.

Start the stopwatch, or observe the **exact** time on the watch or clock. In either case, write down the exact time at which testing commenced. At the beginning of the test, move around the room and check that each candidate has begun to mark the answers in the correct manner.

9 After exactly 30 minutes, say:

Stop work. Put your pencils down. Place your closed test booklet on the left side of your desk and your answer sheet alongside it.

10 Collect test booklets and answer sheets (and pencils and erasers, if necessary) from each candidate. Count and verify that all materials have been collected. Place the materials in a secure place and dismiss the candidates.

Directions for Scoring

The ACER Applied Reading Test uses an OMR answer sheet which may be scored with an OMR scoring machine or by hand. Details of both procedures are provided below, and a list of correct answers for each form is provided in Appendix 1.

It is important that all details on answer sheets should be completed, particularly candidates' names, addresses and dates of birth, so that each candidate record is distinct.

Hand Scoring

Select the appropriate score key for the form of the test which has been used (Form A or Form B). Place the score key on top of the answer sheet so that all items on the answer sheet and answers on the score key are aligned. There is only **one** correct answer for each item, and candidates' responses should be marked as correct if the correct answer **only** has been given (the transparent overlay score key permits easy detection of multiple responses). A candidate's score is simply the total of correct answers on the test, which is known as a "raw score".

To eliminate errors which can occur in hand scoring, the number of incorrect answers and the number of unanswered items can be added together and subtracted from 32. The result should equal the number of correct answers.

OMR Scoring

OMR scoring of the ACER Applied Reading Test is carried out by ACER's Test Scoring Service. If OMR scoring is required, answer sheets **must** be marked with HB pencils so that the OMR scoring machine can read candidates' responses. It is advisable to give advance notice of intention to use the OMR scoring facility by telephoning ACER or by forwarding an OMR Scoring Service Advance Notice Form (obtainable from ACER). Answer sheets should be bundled and placed between heavy card to prevent damage in transit, with an OMR Scoring Service Order Form (obtainable from ACER) completed and enclosed with each batch of answer sheets. Once packaged, the answer sheets should be returned to the Testing Services Officer at ACER. Turnaround time is normally five working days from receipt of the answer sheets at ACER.

Interpretation of Test Scores

Reference Group Data and Derived Scores

In order to compare a candidate's score on the ACER Applied Reading Test with those of other persons, a standard for comparison can be provided by a distribution of scores obtained by a relevant "reference group" (i.e. a large, representative sample of a relevant population). A candidate's raw score can be converted to a "derived score", which indicates the candidate's relative standing in regard to the reference group. Reference group data for the ACER Applied Reading Test are provided as four types of derived score and an associated descriptive rating, as detailed below.

Percentile Rank - This derived score indicates the percentage of candidates expected to fall at or below a particular raw score (e.g. a percentile rank of 90 indicates that 90 per cent of the reference group scored at or below that score, and 10 per cent of the reference group scored above that score). Percentile ranks are commonly used for making reasonably fine comparisons between levels of performance by different candidates or between levels of performance on different tests by one candidate, and for providing more detailed feedback to candidates about how they performed on a test.

Stanine - The stanine is a relatively broad standard score which varies in value from 1 to 9, with a mean of 5 and a standard deviation (SD) of approximately 2. The stanine is commonly used for making broad comparisons between levels of performance by different candidates or between levels of performance on different tests by one candidate, and for providing less detailed feedback to candidates about how they performed on a test.

Descriptive Rating - This is based upon the stanine, and provides a more general, verbal description of performance. Candidates with a stanine of 9 are rated "High", candidates with a stanine of 8 or 7 are rated "Above Average", candidates with a stanine of 6, 5 or 4 are rated "Average", candidates with a stanine of 3 or 2 are rated "Below Average", and candidates with a stanine of 1 are rated "Low". Such descriptive ratings are of value for providing broad, more easily understood feedback to candidates about how they performed on a test. For information concerning the relationship between descriptive ratings, stanines and percentile ranks, see Table 1 below.

Table 1: Relationship Between Descriptive Ratings, Stanines and Percentile Ranks

Descriptive Rating (Expected Percentage)	Stanine (Expected Percentage)	Expected Range of Percentile Ranks
High (4%)	9 (4%)	>95
Above Average (19%)	8 (7%) 7 (12%)	89-95 77-88
Average (54%)	6 (17%) 5 (20%) 4 (17%)	60-76 40-59 23-39
Below Average (19%)	3 (12%) 2 (7%)	11-22 4-10
Low (4%)	1 (4%)	<4

T-Score - This derived score is a standard score with a mean of 50 and a SD of 10. The T-score is commonly used for making fine comparisons between levels of performance by different candidates or between levels of performance on different tests by one candidate. Unlike the percentile rank, the T-score can be combined with T-scores from other tests into a single score reflecting a candidate's overall level of performance across an entire battery of tests. It is also a less approximate score than the stanine, and is suitable for use in statistical analyses.

z-Score - This derived score is a standard score with a mean of 0 and a SD of 1. The z-score is the most basic standardization of the raw score, and has the same applications as the T-score; however, roughly half of its distribution is negative, and use of the z-score can easily lead to confusion for this reason. The z-score has been included primarily for the benefit of researchers who prefer using this type of standard score in statistical analyses.

Preliminary reference group data for both forms of the ACER Applied Reading Test were obtained in 1988. The sample for Form A comprised 284 candidates (130 applicants for plumbing apprenticeships with a trade association, 65 applicants for apprenticeships with a large private sector employer in the automotive industry, two applicants for electrical apprenticeships with a small private sector employer, and 87 applicants for places in an Advanced Certificate of Electronics at an institute of technology). The sample for Form B comprised 372 candidates (123 applicants for plumbing apprenticeships with a trade association, 221 applicants for apprenticeships with a large private sector employer in the automotive industry, 21 applicants for apprenticeships with a building trades group apprenticeship scheme, and seven applicants for electrical apprenticeships with a small private sector employer). Both samples were predominantly male. The reference group data are presented below in Table 2 for Form A and Table 3 for Form B (see pp.10-11).

Using Reference Group Tables to Interpret Test Scores

To use the reference group tables, select the appropriate table (Table 2 for Form A or Table 3 for Form B). Locate a candidate's raw score in the left and right columns, and place a ruler or other straight edge immediately below these. Derived scores and a descriptive rating for the candidate can then be read easily.

The particular derived score to be used will depend upon the circumstances in which the ACER Applied Reading Test has been used. When the test has been used on its own, the percentile rank or stanine would be most suitable for comparing candidates, depending upon the degree of precision required. Both can be used for providing feedback to candidates about how they performed on the test, and the descriptive rating is of particular value for this purpose.

If other tests have been administered, the percentile rank and stanine can also be used to compare a candidate's performance on different tests, but **only** if reference group data for the other tests are based upon comparable samples.

When other tests have been administered and a single score reflecting a candidate's overall level of performance across the entire battery of tests is required, the T-score would be most suitable. The T-score can be combined with T-scores for other tests, but **only** if reference group data for the other tests are based upon comparable samples. Further, performance on individual tests should **not** be disregarded in such circumstances, as a single overall score for the battery can obscure considerable variation between individual test scores.

For research purposes involving statistical analyses, the T-score and z-score are most suitable, but feedback to candidates in such circumstances would still be preferable in the form of a percentile rank, stanine and/or descriptive rating.

The reliance which can be placed upon individual scores on the ACER Applied Reading Test is indicated by the standard error of measurement, which is discussed in the Technical Details section (see p.13). If further detail concerning interpretation of test scores is required, Lyman (1986) provides a relatively non-technical discussion. For more technical detail, refer to a standard textbook on psychological testing.

Table 2: ACER Applied Reading Test Form A Preliminary Reference Group Data: Apprenticeship and Trainee Technician Applicants

Raw Score	Percentile Rank	Stanine	Descriptive Rating	T-Score	z-Score	Raw Score
32	>99	9	High	71	2.1	32
31	99	9		69	1.9	31
30	98	9		67	1.7	30
29	97	9		65	1.5	29
28	93	8	Above Average	64	1.4	28
27	87	7		62	1.2	27
26	81	7		60	1.0	26
25	75	6		58	0.8	25
24	70	6	Average	57	0.7	24
23	64	6		55	0.5	23
22	57	5		53	0.3	22
21	51	5		51	0.1	21
20	49	5	Average	49	-0.1	20
19	40	4		48	-0.2	19
18	35	4		46	-0.4	18
17	29	4		44	-0.6	17
16	23	4	Below Average	42	-0.8	16
15	19	3		41	-1.0	15
14	16	3		39	-1.1	14
13	12	3		37	-1.3	13
12	9	2	Below Average	35	-1.5	12
11	6	2		33	-1.7	11
10	4	1		32	-1.8	10
9	2	1		30	-2.0	9
8	1	1	Low	28	-2.2	8
7	1	1		26	-2.4	7
6	1	1		25	-2.6	6
<6	<1	1		23	-2.7	<6

N = 284

Mean = 20.4

SD = 5.6

Table 3: ACER Applied Reading Test Form B Preliminary Reference Group Data: Apprenticeship Applicants

Raw Score	Percentile Rank	Stanine	Descriptive Rating	T-Score	z-Score	Raw Score
32	99	9		68	1.7	32
31	97	9	High	66	1.6	31
30	94	8		64	1.4	30
29	90	8	Above	62	1.2	29
28	84	7	Average	60	1.0	28
27	77	7		58	0.8	27
26	69	6		56	0.6	26
25	60	6		54	0.4	25
24	53	5		53	0.2	24
23	48	5	Average	51	0.1	23
22	42	5		49	-0.1	22
21	36	4		47	-0.3	21
20	29	4		45	-0.5	20
19	24	4		43	-0.7	19
18	19	3		41	-0.9	18
17	14	3		39	-1.1	17
16	11	3	Below Average	38	-1.3	16
15	9	2		36	-1.4	15
14	7	2		34	-1.6	14
13	5	2		32	-1.8	13
12	4	1		30	-2.0	12
11	3	1		28	-2.2	11
10	2	1		26	-2.4	10
9	2	1	Low	24	-2.6	9
8	1	1		23	-2.8	8
7	1	1		21	-2.9	7
6	<1	1		19	-3.1	6
<6	<1	1		17	-3.3	<6

N = 372
 Mean = 22.7
 SD = 5.3

Local Norms

If a large group of candidates, such as 200+, is tested and local psychometric expertise is available, the distribution of scores obtained by that group could serve as local norms. Even if the group is too small for this purpose, there is value in comparing performance with the reference group data provided in this manual, and data can be accumulated until the sample is large enough to permit preparation of local norm tables.

Technical Details

Using the apprenticeship/trainee technician applicant samples upon which the preliminary reference group data in Table 2 and Table 3 were based and two samples of technical school students (detailed below), statistical analyses of both forms of the ACER Applied Reading Test were carried out and are reported below. All tests of statistical significance were two-tailed, and a .05 level of significance was employed throughout.

Equivalence of Parallel Forms

In order to investigate the equivalence of Form A and Form B of the ACER Applied Reading Test, both forms were administered in counterbalanced order to a sample of technical school students. This sample comprised 75 Year 10 students from two Melbourne technical schools and 13 Year 11 students from another Melbourne technical school, giving a total sample of 88 subjects. Sixty-five (74%) of the subjects were male, and 23 were female. Age ranged from 15 to 17, with a mean of 15.9 years. The results of basic analyses and an assessment by Pearson product-moment correlation coefficient of the degree of relationship between the two forms are shown below in Table 4.

Table 4: Means, Standard Deviations, and Correlation Between ACER Applied Reading Test Forms A and B in a Sample of Technical School Students

Form	Mean	SD	<i>r</i>
A	19.9	5.1	.85***
B	20.3	5.4	

- * $p < .05$
** $p < .01$
*** $p < .001$

As shown above in Table 4, the means and SDs for both forms of the test were very similar. Further, a correlation coefficient of .85 was obtained, indicating a high degree of relationship between the two forms. Given that the two forms are also very similar in regard to content and length, these findings suggest that the forms can be regarded as parallel (for criteria of equivalence, see Ferguson, 1976). The relatively small sample size, however, impresses the need to support this interpretation with analysis of further data, as these become available.

As a further cautionary note in regard to equivalence of the forms, the difference of more than 2 points in means between the Form A and Form B apprenticeship/trainee technician samples shown in Table 2 and Table 3 should be noted, although it should also be borne in mind that these data were obtained from separate samples drawn largely from different sources, unlike the matched sample of technical school students.

Reliability

The reliability of a test refers to the consistency with which it measures the construct of relevance. The higher the reliability of a test, the higher its consistency in measurement of the relevant construct and the higher the degree of confidence that a score on the test is attributable to that construct and not to error variance.

One way of measuring reliability is to assess the correlation between parallel forms of a test by administering these to the same subjects in counterbalanced order. As outlined above, such a procedure was undertaken to investigate the equivalence of the parallel forms of the ACER Applied Reading Test, with a correlation coefficient of .85 being obtained between the two forms. This finding not only supports the interpretation that the two forms are parallel, but also indicates a satisfactory level of parallel form reliability for the test.

Another way of measuring reliability is to assess the internal consistency, or homogeneity, of a test by correlating the score for one half of the items with the score for the other half. The Kuder-Richardson formula 20 (KR20) provides a measure of reliability based upon all possible split-halves of a test, and was applied to the apprenticeship/trainee technician applicant samples for each form of the ACER Applied Reading Test. Results of this analysis were KR20 reliability coefficients of .83 for Form A and .82 for Form B, indicating a satisfactory level of internal consistency reliability for each form of the test. The KR20 was also applied to the data obtained from the parallel forms sample of technical school students detailed above, resulting in KR20 reliability coefficients of .78 for Form A and .81 for Form B, further indicating a satisfactory level of internal consistency reliability for each form of the test.

Standard Error of Measurement

Any test score necessarily contains an error component and therefore cannot be a perfect indicator of a candidate's ability. However, the degree of confidence which can be placed in the accuracy of a candidate's raw score can be established with the standard error of measurement (SEM). The SEM provides an estimate of the range within which a candidate's score would be expected to fall if tested repeatedly without influence from fatigue or practice effect. Particular levels of confidence can be attached to this range by interpreting the SEM as a SD of error; that is, a 68 per cent level of confidence can be applied to the range from one SEM below a score to one SEM above, and a 95 per cent level of confidence can be applied to the range from two SEMs below a score to two SEMs above.

For the apprenticeship/trainee technician applicant samples and the parallel forms sample of technical school students, the SEM for each form of the ACER Applied Reading Test was found to be 2.3. For a 32-item test of reading ability, this constitutes a satisfactory SEM. As an example of application of the SEM, a score of 20 on either form of the test means that a 68 per cent level of confidence can be applied to that candidate's score repeatedly falling within the approximate score-band 18-22 (i.e. the candidate's score would be expected to fall within the 18-22 band on approximately 7 occasions out of 10), and a 95 per cent level of confidence can be applied to the approximate score-band 15-25.

The SEM can also be used to decide whether or not there is an appreciable difference between the scores of different candidates, based upon the degree of overlap of the SEM ranges around each candidate's score. A guideline for such decisions is that if the ranges from one SEM below to one SEM above the scores of each of two candidates overlap by less than half or do not overlap at all, an appreciable difference in performance can be considered to exist between the two candidates.

Validity

The validity of a test refers to the extent to which it actually measures the construct of relevance, which, for the ACER Applied Reading Test, is the ability to read and understand technical reading material. Validity is assessed by investigating the relationship between performance on the test and other data pertinent to the construct of relevance.

Construct validity can be assessed by determining the degree of correlation between a test and other tests of the same construct. A similar test to the ACER Applied Reading Test is the Industrial Reading Test, an American test of "ability to comprehend written technical materials" (The Psychological Corporation, 1978, p.3). In order to investigate construct validity, Form A of the ACER Applied Reading Test and Form B of the Industrial Reading Test were administered in counterbalanced order to a second sample of technical school students. This second sample comprised 61 Year 10 students from four Melbourne technical schools. Thirty (49%) of the subjects were male, and 31 were female. Age ranged from 15 to 17, with a mean of 15.7 years. The results of basic analyses and an assessment by Pearson product-moment correlation coefficient of the degree of relationship between the two tests are shown below in Table 5.

Table 5: Means, Standard Deviations, and Correlation Between ACER Applied Reading Test Form A and Industrial Reading Test Form B in a Sample of Technical School Students

Test	Mean	SD	<i>r</i>
ACER Applied Reading Test Form A	21.2	5.1	.82***
Industrial Reading Test Form B	25.3	6.0	

* $p < .05$

** $p < .01$

*** $p < .001$

As shown above in Table 5, a correlation coefficient of .82 was obtained between the two tests, indicating a satisfactory level of construct validity for the ACER Applied Reading Test. It is also of interest to note the similarity in level of difficulty between the two tests, with the mean of 21.2 on the 32-item ACER Applied Reading Test and the mean of 25.3 on the 38-item Industrial Reading Test indicating an overall facility level of approximately 66 per cent for each test.

A particularly important aspect of validity for the ACER Applied Reading Test is predictive validity - that is, ability to predict competence at the level of reading required for on-the-job performance. At this early stage, the ACER Applied Reading Test has not been in use for sufficient time to permit the collection of predictive validity data. Consequently, it is recommended that users monitor the performance of employees who have been selected using the test, with a view to achieving local validation of the test. Feedback of such performance data would be appreciated by ACER, as this would contribute to the accumulation of overall validity data for the test. In return, assistance could be provided in analysing the data for application in local validation.

Practice Effect

It is generally recognized that administration of the same form of a test on more than one occasion results in improved performance on latter occasions due to "practice effect", or familiarity with that form. Anastasi advises that "gains in score are also found on retesting with parallel forms of the same test, although such gains tend in general to be smaller" (1968, p.569), and that "significant mean gains have been reported when alternate forms of a test were administered in immediate succession or after intervals" (p.569). In order to investigate the influence of such practice effect upon the ACER Applied Reading Test, the data from the parallel forms sample of technical school students were divided into two groups on the basis of the order of administration, with those subjects having sat Form A first being allocated to Group 1 and those having sat Form B first being allocated to Group 2. The results of basic analyses and an assessment by *t* test of the significance of difference between mean scores are shown below in Table 6.

Table 6: Influence of Practice Effect Upon ACER Applied Reading Test Forms A and B in a Sample of Technical School Students

Group	Form (Order of Administration)	Mean	SD	N	<i>t</i>
1	A (1st)	19.7	4.7	47	.42
	B (2nd)	19.6	5.1		
2	B (1st)	21.1	5.8	41	2.25*
	A (2nd)	20.0	5.5		

*	$p < .05$
**	$p < .01$
***	$p < .001$

As shown above in Table 6, there was no gain in score from the first test to the second test for either group. Conversely, there was a slight but statistically significant drop in performance for Group 2. This unanticipated finding might be considered a consequence of the rather small sample size for each group; however, it might also be considered the result of the testing having been carried out at the end of the school year, with students having little motivation to perform well on the test and any motivation arguably decreasing throughout the testing session. On the basis of these data, it appears that performance on the ACER Applied Reading Test is not influenced by practice effect, but once more the small sample size impresses the need to support this interpretation with analysis of further data as these become available.

Correlations with Other Tests

Each form of the ACER Applied Reading Test was administered to the apprenticeship/trainee technician applicant samples in varying combination with the ACER Mathematics Test E (Revised) and a number of tests selected from an Australian adaptation of the U.S. Department of Labor's General Aptitude Test Battery (GATB). Pearson product-moment correlation coefficients were calculated for each form of the ACER Applied Reading Test and each of the other tests, and are shown below in Table 7.

Table 7: Correlations Between ACER Applied Reading Test Forms A and B, and ACER Mathematics Test E (Revised) and Selected Tests from the GATB in Samples of Apprenticeship and Trainee Technician Applicants

Form	Test				
	ACER Maths. Test E	GATB Three Dim. Space	GATB Figure Matching	GATB Shape Matching	GATB Mark Making
A	.66*** <i>n</i> = 284	.35*** <i>n</i> = 284	.20*** <i>n</i> = 284	.32*** <i>n</i> = 284	.05 <i>n</i> = 219
B	.55*** <i>n</i> = 372	.22*** <i>n</i> = 372	.12* <i>n</i> = 372	.21*** <i>n</i> = 372	.20* <i>n</i> = 151

* $p < .05$

** $p < .01$

*** $p < .001$

As shown above in Table 7, both forms of the ACER Applied Reading Test had varying degrees of correlation with the other tests. Correlations with the GATB Mark Making, a pencil-and-paper test of motor co-ordination, were low (.05 for Form A and .20 for Form B), and correlations with the GATB Figure Matching and the GATB Shape Matching, tests of different aspects of perceptual aptitude, were moderately low (.20 for Form A and .12 for Form B, and .32 for Form A and .21 for Form B, respectively). Correlations with the GATB Three Dimensional Space, a test of spatial aptitude, were slightly higher (.35 for Form A and .22 for Form B), and correlations with the ACER Mathematics Test E (Revised), a test of basic mathematical ability, were moderately high (.66 for Form A and .55 for Form B).

These relationships suggest that the construct measured by the ACER Applied Reading Test is largely unrelated to motor co-ordination, is moderately related to perceptual aptitude and spatial aptitude, and is moderately highly related to mathematical ability. These relationships conform with the general expectations of a test of reading ability, the moderately high correlation with the ACER Mathematics Test E suggesting the influence of a school achievement factor.

Relationship Between Age and Performance on the ACER Applied Reading Test

Using the apprenticeship/trainee technician samples, Pearson product-moment correlation coefficients were calculated to investigate the relationship between age (in years) and performance on the ACER Applied Reading Test. For Form A, age data were available for 228 subjects. The age of these Form A subjects ranged from 15 to 37, with a mean of 17.3 years and a SD of 2.6 years. For Form B, age data were available for 243 subjects. The age of these Form B subjects ranged from 15 to 38, with a mean of 17.8 years and a SD of 1.8 years. The results of these analyses were a correlation of -.06 (n.s.) between Form A and age, and a correlation of .18 ($p < .01$) between Form B and age.

Similar analyses were carried out using the parallel forms sample of technical school students, resulting in a correlation of -.06 (n.s.) between Form A and age, and a correlation of -.07 (n.s.) between Form B and age.

Overall, these results suggest that performance on both forms of the ACER Applied Reading Test is not related to age, although the relatively small sample size limits confidence in this interpretation until further data become available.

Relationship Between Sex and Performance on the ACER Applied Reading Test

For the apprenticeship/trainee technician samples, the numbers of females were too small to permit investigation of the relationship between sex and performance on the ACER Applied Reading Test. However, twenty-three (26%) of the subjects in the parallel forms sample of technical school students were females, permitting investigation within this sample. The results of basic analyses and an assessment by *t* test of the significance of difference between mean scores are shown below in Table 8.

Table 8: Influence of Sex Upon ACER Applied Reading Test Forms A and B in a Sample of Technical School Students

Form	Sex	Mean	SD	N	<i>t</i>
A	Male	19.8	5.0	65	-.15
	Female	20.0	5.5	23	
B	Male	19.8	5.3	65	-1.45
	Female	21.7	5.8	23	

* $p < .05$

** $p < .01$

*** $p < .001$

As shown above in Table 8, for Form A, the mean score achieved by males was 19.8 and the mean score achieved by females was 20.0. The result of the *t* test indicated that the difference between these mean scores was not significant. For Form B, the mean score achieved by males was 19.8 and the mean score achieved by females was 21.7, with the result of the *t* test once more indicating that the difference between these mean scores was not significant.

Overall, these results suggest that performance on both forms of the ACER Applied Reading Test is not related to sex, although the small sample size once more limits confidence in this interpretation until further data become available.

References

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- Ferguson, G.A. *Statistical Analysis in Psychology and Education* (4th ed.). New York: McGraw-Hill, 1976.
- Lyman, H.B. *Test Scores and What They Mean* (4th ed.). Englewood Cliffs, N.J.: Prentice-Hall, 1986.
- The Psychological Corporation. *Industrial Reading Test Manual*. New York: The Psychological Corporation, 1978.

Appendix 1: List of Correct Answers

FORM A

1 A	11 A	21 C	31 D
2 C	12 A	22 D	32 B
3 B	13 C	23 B	
4 D	14 A	24 C	
5 A	15 C	25 A	
6 C	16 B	26 C	
7 B	17 B	27 D	
8 B	18 D	28 C	
9 A	19 C	29 B	
10 C	20 D	30 B	

FORM B

1 D	11 D	21 B	31 D
2 B	12 C	22 B	32 B
3 C	13 C	23 C	
4 B	14 B	24 D	
5 A	15 A	25 C	
6 D	16 A	26 D	
7 A	17 D	27 C	
8 A	18 A	28 C	
9 D	19 A	29 B	
10 B	20 C	30 D	

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ACER would also like to thank all initial users of the test for provision of data used in the reference group tables provided herein.

ACER would also like to thank the following publishers for permission to adapt and use text from their publications within the test, as detailed below.

Passage 1, Form A

From May, T.E., & Crouse, W.H. *Automotive Mechanics*, Vol. 1 (4th ed.). Roseville: McGraw-Hill, 1987.

Passage 5, Form A

From Vail, G.E., Phillips, J.A., Rust, L.O., Griswold, R.M., & Justin, M.M. *Food* (7th ed.). Boston: Houghton Mifflin, 1978. Copyright © 1978 Houghton Mifflin Company. All rights reserved. Used with permission.

Passage 6, Form A

From *Basic Training Manual No. 11: Workshop Safety*. Canberra: Australian Government Publishing Service, 1981.

Passage 2, Form B

From course notes for the subject TAFE General Mechanics 2. South Australia: Department of TAFE, 1977.

Passage 5, Form B

From *Code of Practice for the Control and Safe Handling of Radioactive Sources used for Therapeutic Purposes* (1988). Canberra: Australian Government Publishing Service, 1989.

Passage 6, Form B

From Vail, G.E., Phillips, J.A., Rust, L.O., Griswold, R.M., & Justin, M.M. *Food* (7th ed.). Boston: Houghton Mifflin, 1978. Copyright © Houghton Mifflin Company. All rights reserved. Used with permission.

ACER APPLIED READING TEST ANSWER SHEET

Name: _____

Address: _____

Age: _____
 _____ Years _____ Months

Today's Date: _____
Day Month Year

Sex: ☐ M ☐ F

Test Form: A B C

INSTRUCTIONS

Do not go over edges of boxes.
Use only HB or B pencils.
Erase mistakes fully.

Mark answers with a single pencil line thus:

A	B	C	D

Practice Examples:

P1 A B C D

P2 A B C D

	A	B	C	D
P3	☐	☐	☐	☐

OFFICE USE ONLY

0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Print name in boxes here, → then mark box to underline appropriate letter in each column.

Example:

E	A	D	E
A	A	A	A
B	B	B	B
C	C	C	C
D	D	D	D
E	E	E	E

SURNAME

INITIALS.

[illegible]

Date of Birth

Date of Birth				
Day		Month		Year
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
	4	4	4	4
	5	5	5	5
	6	6	6	6
	7	7	7	7
	8	8	8	8
	9	9	9	9

1 ☐ A ☐ B ☐ C ☐ D	11 ☐ A ☐ B ☐ C ☐ D	21 ☐ A ☐ B ☐ C ☐ D	31 ☐ A ☐ B ☐ C ☐ D
2 ☐ A ☐ B ☐ C ☐ D	12 ☐ A ☐ B ☐ C ☐ D	22 ☐ A ☐ B ☐ C ☐ D	32 ☐ A ☐ B ☐ C ☐ D
3 ☐ A ☐ B ☐ C ☐ D	13 ☐ A ☐ B ☐ C ☐ D	23 ☐ A ☐ B ☐ C ☐ D	
4 ☐ A ☐ B ☐ C ☐ D	14 ☐ A ☐ B ☐ C ☐ D	24 ☐ A ☐ B ☐ C ☐ D	
5 ☐ A ☐ B ☐ C ☐ D	15 ☐ A ☐ B ☐ C ☐ D	25 ☐ A ☐ B ☐ C ☐ D	
6 ☐ A ☐ B ☐ C ☐ D	16 ☐ A ☐ B ☐ C ☐ D	26 ☐ A ☐ B ☐ C ☐ D	
7 ☐ A ☐ B ☐ C ☐ D	17 ☐ A ☐ B ☐ C ☐ D	27 ☐ A ☐ B ☐ C ☐ D	
8 ☐ A ☐ B ☐ C ☐ D	18 ☐ A ☐ B ☐ C ☐ D	28 ☐ A ☐ B ☐ C ☐ D	
9 ☐ A ☐ B ☐ C ☐ D	19 ☐ A ☐ B ☐ C ☐ D	29 ☐ A ☐ B ☐ C ☐ D	
10 ☐ A ☐ B ☐ C ☐ D	20 ☐ A ☐ B ☐ C ☐ D	30 ☐ A ☐ B ☐ C ☐ D	

DO NOT FOLD OR DEFACE THIS SHEET IN ANY WAY

1 ☐ A ☐ B ☒ C ☐ D	11 ☐ A ☐ B ☒ C ☐ D	21 ☐ A ☐ B ☒ C ☐ D	31 ☐ A ☐ B ☒ C ☐ D
2 ☐ A ☐ B ☒ C ☐ D	12 ☐ A ☐ B ☒ C ☐ D	22 ☐ A ☐ B ☒ C ☐ D	32 ☐ A ☐ B ☒ C ☐ D
3 ☐ A ☐ B ☒ C ☐ D	13 ☐ A ☐ B ☒ C ☐ D	23 ☐ A ☐ B ☒ C ☐ D	
4 ☐ A ☐ B ☒ C ☐ D	14 ☐ A ☐ B ☒ C ☐ D	24 ☐ A ☐ B ☒ C ☐ D	
5 ☐ A ☐ B ☒ C ☐ D	15 ☐ A ☐ B ☒ C ☐ D	25 ☐ A ☐ B ☒ C ☐ D	
6 ☐ A ☐ B ☒ C ☐ D	16 ☐ A ☐ B ☒ C ☐ D	26 ☐ A ☐ B ☒ C ☐ D	
7 ☐ A ☐ B ☒ C ☐ D	17 ☐ A ☐ B ☒ C ☐ D	27 ☐ A ☐ B ☒ C ☐ D	
8 ☐ A ☐ B ☒ C ☐ D	18 ☐ A ☐ B ☒ C ☐ D	28 ☐ A ☐ B ☒ C ☐ D	
9 ☐ A ☐ B ☒ C ☐ D	19 ☐ A ☐ B ☒ C ☐ D	29 ☐ A ☐ B ☒ C ☐ D	
10 ☐ A ☐ B ☒ C ☐ D	20 ☐ A ☐ B ☒ C ☐ D	30 ☐ A ☐ B ☒ C ☐ D	

1 ☐ A ☐ B ☐ C ☒ D	11 ☐ A ☐ B ☐ C ☒ D	21 ☐ A ☒ B ☐ C ☐ D	31 ☐ A ☐ B ☐ C ☒ D
2 ☐ A ☒ B ☐ C ☐ D	12 ☐ A ☐ B ☒ C ☐ D	22 ☐ A ☒ B ☐ C ☐ D	32 ☐ A ☒ B ☐ C ☐ D
3 ☐ A ☐ B ☒ C ☐ D	13 ☐ A ☐ B ☒ C ☐ D	23 ☐ A ☐ B ☒ C ☐ D	
4 ☐ A ☒ B ☐ C ☐ D	14 ☐ A ☒ B ☐ C ☐ D	24 ☐ A ☐ B ☐ C ☒ D	
5 ☒ A ☐ B ☐ C ☐ D	15 ☒ A ☐ B ☐ C ☐ D	25 ☐ A ☐ B ☒ C ☐ D	
6 ☐ A ☐ B ☐ C ☒ D	16 ☒ A ☐ B ☐ C ☐ D	26 ☐ A ☐ B ☐ C ☒ D	
7 ☒ A ☐ B ☐ C ☐ D	17 ☐ A ☐ B ☐ C ☒ D	27 ☐ A ☐ B ☒ C ☐ D	
8 ☒ A ☐ B ☐ C ☐ D	18 ☒ A ☐ B ☐ C ☐ D	28 ☐ A ☐ B ☒ C ☐ D	
9 ☐ A ☐ B ☐ C ☒ D	19 ☒ A ☐ B ☐ C ☐ D	29 ☐ A ☒ B ☐ C ☐ D	
10 ☐ A ☒ B ☐ C ☐ D	20 ☐ A ☐ B ☒ C ☐ D	30 ☐ A ☐ B ☐ C ☒ D	